

Figure 1: Initiator Molecule Self-assembled into a Monolayer on a Surface.

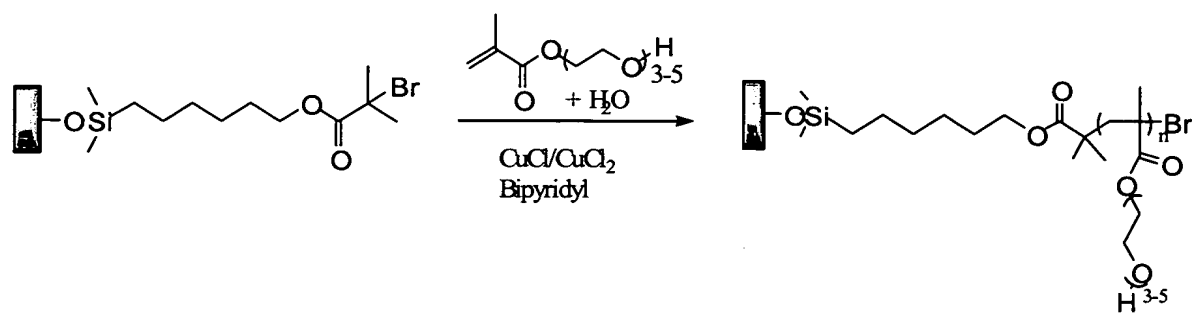


Figure 2: Growing PEGAA Films on a Substrate Using Surface Atom Transfer Radical Polymerization.



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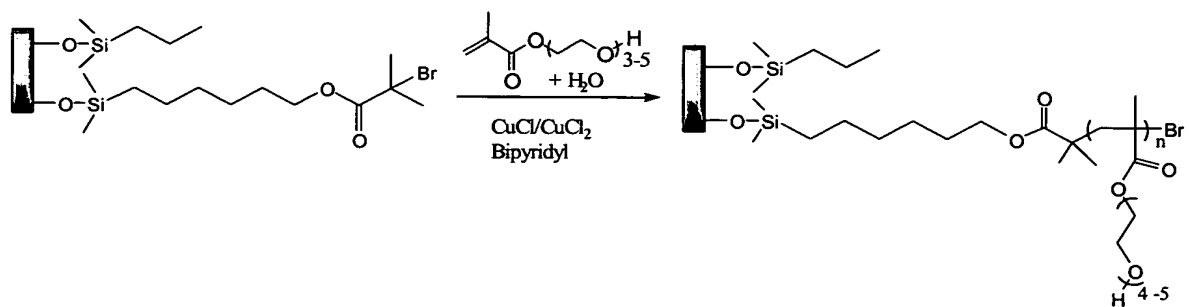
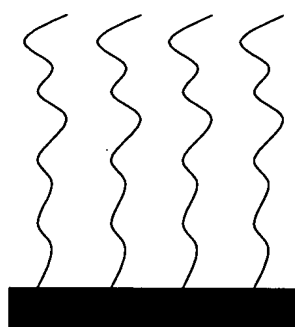


Figure 4: Bonding of PEGAA Polymer Chains to the Initiator Molecules Contained in a SAM Comprised of Both Initiator and Spacer Molecules.



Surface ATRP

5a



Macromolecule self-assembling method

5b

Figure 5a: PEGAA Polymer Chains Vertically Grown in Accordance with the SATRP Process of the Invention.

Figure 5b: Random Coil Deposition of Polymer Chains in Accordance with the Self-assembling Technique of Chapman et al.

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Figure 6: E. Coli Cell Adsorption on a Silica Wafer Prepared in Accordance with Example 11. No E. Coli Cells Were Observed Adhering to the Silica Wafer Substrate (20x image).

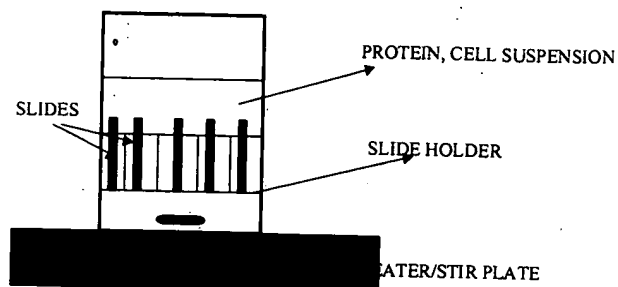
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Figure 9: E. Coli Cell Adsorption on a Silicon Wafer Coated with a 20 nm Thick PEGM Polymer Layer in Accordance with the Process of Example 5. No E. Coli Cells were Observed Adhering to the Silica Wafer Substrate (20X Image).

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Schematic of a test cell for protein & cell binding experiments



*For any given condition, we simulate two states*

*A. Protein level built up on surface (load)*

*B. Irreversible protein level remaining on a surface (desorb)*

Figure 10: Schematic of Test Cell for Protein and Cell Binding Experiments.

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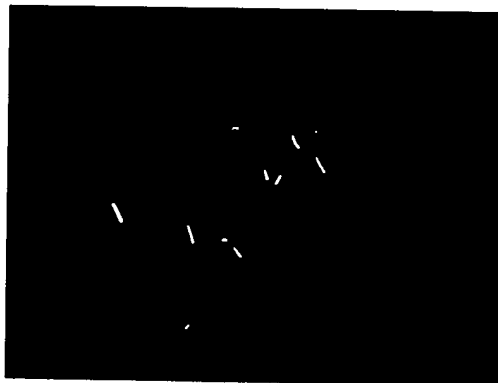


Figure 8: E. Coli Cell Adsorption on a Silicon Wafer Coated with the Initiator Monolayer of Example 4. E. Coli Cells Were seen Densely Binding to the Initiator Monolayer Grown on the Silica Substrate (100X Image).

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Figure 7: E. Coli Cell Adsorption on a Silicon Wafer Coated with the Initiator Monolayer of Example 4. E. Coli Cells Were Seen Densely Binding to the Initiator Monolayer Grown on Silica Substrate (20X Image).

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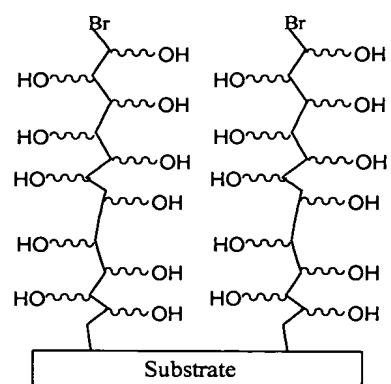
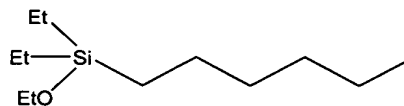
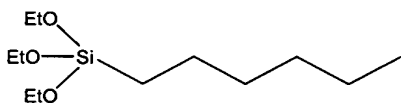


Figure 11: Cartoon Depicting Chemical Group(s) Attached to the Surface of Polymer Chains Grown on a Substrate.

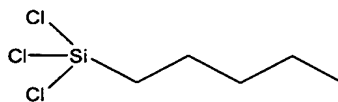
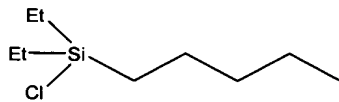
a) An alkyl chain such as:

$$\begin{array}{c} \text{R}_2 \quad \text{R}_3 \\ \diagdown \quad / \\ \text{Si} \\ / \quad \backslash \\ \text{R}_1\text{O} \quad (\text{---})_n \text{CH}_3 \end{array}$$

For Example:

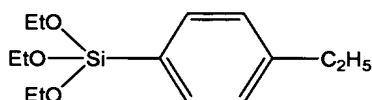
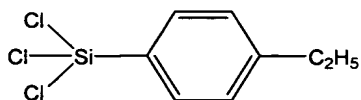
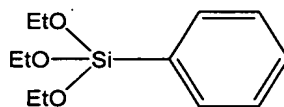
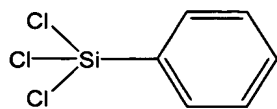

$$\begin{array}{c} R_1 \quad R_2 \\ \diagdown \quad / \\ Si \\ / \quad \backslash \\ Cl \quad (CH_2)_n \quad CH_3 \end{array}$$

For example:

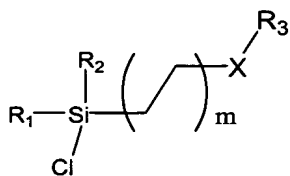
R1[Si](R2)(Cl)c1ccccc1

$R_1 = \text{Cl, CH}_3, \text{C}_2\text{H}_5, \text{ or alkyl group}$   
 $R_2 = \text{Cl, CH}_3, \text{C}_2\text{H}_5, \text{ or alkyl group}$

For example:



c) A mixture of an alkyl chain and functional groups, for example:



R1 = Cl, CH<sub>3</sub>, C<sub>2</sub>H<sub>5</sub>, or alkyl group

R2 = Cl, CH<sub>3</sub>, C<sub>2</sub>H<sub>5</sub>, or alkyl group

R3 = alkyl group, phenyl, -OH, -NH<sub>2</sub>, etc.

X = O, COO, CONH, etc.

m = 1 to 50

For example:

